test of success, especially as regards prophylaxis. If we make this the basis of our estimates, we find that 4000 consumptives will leave these establishments annually as cured. But, according to the statistics ascertained by the German Imperial Office of Health, there are 226,000 persons in Germany above fifteen years of age who are so far gone in consumption that hospital treatment is necessary for them. Compared with this great number of consumptives the success of the establishments in question seems so small that a material influence on the retrogression of tuberculosis in general is not yet to be expected of them. But pray do not imagine that I wish, by this calculation of mine, to oppose the movement for the establishment of such sanatoria in any way. I only wish to warn against the over-estimating of their importance which has recently been observable in various quarters, based apparently on the opinion that the war against tuberculosis can be waged by means of sanatoria alone, and that other measures are of subordinate value. In reality the contrary is the case. What is to be achieved by the general prophylaxis resulting from recognition of the danger of infection and the consequent greater caution in intercourse with consumptives is shown by a calculation of Cornet's regarding the decrease of mortality from tuberculosis in Prussia in the years 1889 to 1897. Before 1889 the average was 31·4 per 10,000, whereas in the period named it sank to 21·8, which means that, in that short space of time, the number of deaths from tuberculosis was 184,000 less than was to be expected from the average of the preceding years. In New York, under the influence of the general sanitary measures directed in a simply exemplary manner by Biggs, the mortality from tuberculosis has diminished by more than 35 per cent. since 1886. And it must be remembered that both in Prussia and New York the progress indicated by these figures is due to the first beginnings of these measures. Considerably greater success is to be expected of their further development. Biggs hopes to have got so far in five years that in the city of New York alone the annual number of deaths from tuberculosis will be 3000 less than formerly. I take this opportunity of most urgently recommending Dr. Biggs' organisation to the study and imitation of all municipal sanitary authorities.

Now, I do indeed believe that it will be possible to render the sanatoria considerably more efficient. If strict care be taken that only patients be admitted for whom the treatment of those establishments is well adapted, and if the duration of the treatment be prolonged, it will certainly be possible to cure fifty per cent., and perhaps still more. But even then, and even if the number of the sanatoria be greatly increased, the total effect will always remain but moderate. The sanatoria will never render the other measures I have mentioned superfluous. If their number become great, however, and if they perform their functions properly, they may materially aid the strictly sanitary measures in the conflict with tuberculosis.

If now, in conclusion, we glance back once more to what has been done hitherto for the combating of tuberculosis, and forward to what has still to be done, we are at liberty to declare with a certain satisfaction that very promising beginnings have already been made. Among these I reckon the consumption hospitals of England, the legal regulations regarding notification in Norway and Saxony, the organisation created by Biggs in New York, the sanatoria, and the instruction of the people. All that is necessary is to go on developing these beginnings, to test, and if possible to increase, their influence on the diminution of tuberculosis, and wherever nothing has yet been done, to do likewise.

If we are continually guided in this enterprise by the spirit of genuine preventive medical science, if we utilise the experience gained in conflict with other pestilences, and aim, with clear recognition of the purpose and resolute avoidance of wrong roads, at striking the evil at its root, then the battle against tuberculosis, which has been so energetically begun, cannot fail to have a victorious issue.

THE ROYAL HORTICULTURAL SOCIETY'S LILY CONFERENCE.

ON July 16 the Royal Horticultural Society held a conference on "lilies." Although by no means organised upon the same scale as the meeting was two years ago, when hybridisation was discussed, the one under consideration proved, nevertheless, of some importance and much interest.

An exhibition of lilies was also arranged for the same day and the following one, in the Society's Gardens at Chiswick, where the conference took place. The number of plants shown was not large, but taking into consideration the fact that many species had done flowering, while others were not yet in blossom, the series collected together may be put down as a fairly representative one. Possibly more examples might have been displayed if growers had had a little longer notice given to them.

As soon as the inevitable luncheon was cleared away from the tent, the chair was taken by Mr. H. J. Elwes, F.R.S., who had returned from abroad for the purpose. He was also put down upon the programme to give an address on lilies, discovered or brought into cultivation since the issue of his well-known monograph upon these plants.

The chairman, however, deputed this part of his task to Mr. J. G. Baker, F.R.S., and contented himself with making a series of interesting comments upon the various points alluded to by the different speakers. Mr. Baker's contribution being mostly descriptive, he merely alluded briefly in passing to the lilies discovered and in several cases taken up by horticulturists during the last twenty years.

The plants concerned came chiefly from Upper Burma and Central and Western China. Some of the new martagons, however, were discovered in California and North Carolina. Species from the first-mentioned locality were due to the efforts of Sir Henry Collett, while the Chinese ones were collected by French missionaries and by Dr. Henry, who was present and spoke at the conference.

Among the many species and varieties mentioned, one may allude to *Lilium mirabile*, found by one of the missionaries in Western China, and which is unique among lilies in possessing as it does a centrifugal inflorescence; in all others, the lowermost flowers upon the stalk are the first to open. *L. lowei* was shown to be the same thing as *L. bakerianum*, the latter name having priority.

Dr. Henry, who sent home no less than 13.700 specimens of plants, was the next to speak. He was not able to pay special attention to any one kind of plants, so had nothing very particular to say about the habitats of lilies.

He described a day's journey in Western China as up one side of a mountain and down again into the valley on the other side. This speaker also pointed out that there were thousands and thousands of these valleys, each with its own flora, and that there was ample room in the tracts of country he traversed for a hundred collectors of plants.

After several contributions had been made to the meeting, Mr. George Massee had something to say upon the fungoid diseases to which lilies are liable. The chairman had already pointed out how the scientific man was indebted to the professional horticulturist, who introduced and flowered many species that the former would otherwise be unable to figure from living species when monographing a genus, and, again, how the practical man gains through the work of the botanist. Mr. Massee showed very forcibly how the gardener does not profit as much as he might from the labours of the mycologist. Great intelligence was granted to the horticulturist, but within a certain circle; this did not, however, include an appreciation of many simple methods of prevention. For instance, Mr. Massee pointed out that by merely adding a little kainite or Strasburgh fertiliser the most serious "lily disease," which, when it has once taken a hold, is incurable, can be successfully warded off.

When the whole series of papers is printed, growers of lilies should find much information of use to them, while botanists should be grateful to have their knowledge of the species and varieties of lilies brought once more up to date.

WILFRED MARK WEBB.

THE PROPERTIES OF STEEL CASTINGS.

THE first of a series of papers on the result of researches carried out during several years at the Sheffield University College was read by Prof. J. O. Arnold before the Iron and Steel Institute on May 9.

This preliminary paper dealt only with castings composed mainly of iron and carbon. It was shown that such a composition was unsuitable to meet the demands of engineers. The maximum stress recorded in the series was 32·42 tons per sq. in., associated with an elongation of only 2 per cent., whilst the maximum ductility obtained was an elongation of 46 per

© 1901 Nature Publishing Group

cent. on two inches, correlated, however, with a maximum stress of only 19·2 tons per sq. in.

A long series of observations revealed the curious fact that no correlation exists between the densities and mechanical properties of steel castings.

The mechanical influence of annealing at 950° C. and slowly cooling from that temperature is, in the case of iron containing about 0·4 per cent. of carbon, exemplified by the following figures:—

Condition of steel	Elastic limit tons per sq. in.	Max. stress tons per sq. in.	Elongation per cent. on 2 in.	Reduction of area per cent.
As cast... ...	17·22 ...	23·41 ...	6·5 ...	8·4
After annealing..	10·08 ...	24·03 ...	24·5 ...	29·0

The micrographic effect of drastic annealing is shown in the drawing, CC 2, which has been reduced from a 6-inch circle magnified 315 diameters.

The constituents of the steel as cast present an irregular trellis-like pattern of pale ferrite or iron and dark pearlite or steel. In addition, small castings, or small parts of large castings, present curious brown-etching lines of a sulphur alloy, which arrange themselves almost exclusively along the ferrite, forming lines of dangerous weakness.

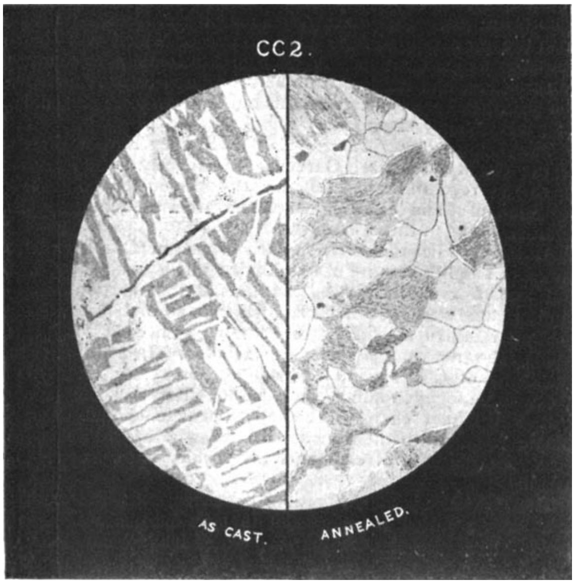

FIG. 1.—Casting CC2. (Reduced from six-inch circle, magnified 315 diameters.)

After annealing, the long lines of cleavage between the constituents are broken up, large patches of laminated pearlite and allotrimorphic crystals of iron being formed. At the same time, the dangerous lines of the attenuated sulphur alloy are destroyed, segregating into isolated patches. All the above features are well indicated in the micrograph figured. Steel castings often present mechanical discrepancies very difficult to explain, *e.g.* elongations per cent. and bending angles form measures of ductility which might be expected to be proportional to each other, but often such is not the case.

A remarkable feature of the results recorded is the fact that some of the castings built up of very large crystals have presented great ductility, whilst castings with that minutely crystalline structure usually supposed to give the best mechanical results have given unsatisfactory tests.

Considering the fact that such castings were of identical chemical composition and had been subjected to similar thermal treatment, it is difficult to avoid the conclusion that the initial temperature of the steel on casting may exert a permanent mechanical influence, and that consequently the operation of annealing is not thoroughly effective.

SCIENTIFIC WORK IN EGYPT.

SEVERAL matters of scientific interest are described in Lord Cromer's report upon the finances, administration and condition of Egypt and the Soudan. Particular attention is directed to Sir William Garstin's memorandum on irrigation, and to the value of the work of hydraulic engineers in Egypt. Sir William Garstin brings forward observations showing a continuous fall of level of Lake Victoria Nyanza. His remarks upon this fall and the rainfall observations available are here reprinted.

"*Lake Victoria Nyanza Rain Gauges.*—Information regarding the daily rainfall and the lake levels is now regularly received in Egypt from Uganda. The first series of registers, previous to the rebellion, dates from June 1, 1896, to July 31, 1897. The second series commences on September 1, 1898, and has been carried on to October 31, 1900. Unfortunately, it is impossible to connect the two series, as the gauges erected subsequent to the rebellion are not the same as those which formerly existed. We have, therefore, only twenty-six months of observations upon which to base possible theories. This is not sufficient, more especially as we are still ignorant of many important factors bearing upon the relations of the levels and rainfall of the equatorial lakes with the Nile supply. Information regarding the most important point of all, viz. the Albert Nyanza Lake, is still entirely wanting. This is much to be regretted, as this lake, which drains an enormous catchment area, and through the northern end of which passes the water coming from the Victoria Lake, is probably the most important of the reservoirs which feed the White Nile. It is to be hoped that early measures may be taken to erect gauges upon the Albert Lake and to observe them regularly. The records thus obtained would be invaluable to Egypt.

"The following facts, elicited from the rather meagre information at our disposal, may perhaps be of general interest:—

"Two observing stations now exist on the Victoria Lake, one on either side, viz. at Port Alice or Entebbe and at Port Victoria or Ugowe. Unfortunately, the rainfall register for Entebbe only commences from the month of April 1900, so a comparison between the two for the whole year is impossible.

"The Ugowe rain gauge record shows that 46·28 inches of rain fell in the twelve months ending with October 1900, that there were 131 rainy days, and that the storms invariably took place either in the afternoon or at night. Further, that February was the wettest month of the year and July the driest, 6·45 inches being registered for the former and 1·56 inches for the latter. It would also appear that the period of the heaviest rainfall is from November to May. The total rainfall for the six months in question was 30·73 inches, the remaining six months being responsible for only 15·55 inches.

"The rainfall at Entebbe, on the opposite side of the lake, was, so far as the records go, considerably heavier than at Ugowe. The total fall between April and November 1900 was 30·39 inches at the former place, as against 20·59 inches at the latter. As regards the rise and fall of the water surface of the lake it is possible to make a comparison, as registers have been supplied regularly from both stations. . . .

"The records, as far as they go, seem to prove that the lake is always at its lowest in October, *i.e.* at the end of the dry season, and at its highest in December or January. They also show that the lake level has been steadily falling for the last three years, thus:—

		Port Alice (Entebbe). Ft.	in.		Port Victoria (Ugowe). Ft.	in.
Lake levels on October 1, 1898	...	3	2	...	3	2½
,, ,, 1899	...	2	6½	...	2	2
,, ,, 1900	...	1	7	...	1	1

"It is possible that this fall in the levels may be, in some measure, due to degradation of the bed of the river in the channel whence it issues from the lake; but it seems to be far more probable that it has been caused by a failure of the rainfall over an immense area. All reports go to show, and all travellers who have visited these regions relate, that a severe drought has prevailed over a large portion of Central Africa during the last two years. This drought has extended as far north as the Egyptian Soudan.

"Although it may seem likely that the Nile flood of 1901 will be a poor one if these figures are correct, it would be misleading to attempt to draw any definite conclusions from them. The

© 1901 Nature Publishing Group